

TEACHING STATEMENT

Neriman Tokcan

It was back in 2010 when I found myself standing in front of a group of students who were there to hear me teaching what was soon to become my first math class. In that moment, a sudden flashback reminded me of the very first time I looked at a formula and grasped the beauty of the concept behind it. I still recall the sensation of triumph and the need to run to my closest friend to explain what I had just unveiled.

These feelings, tethered to my childhood instincts, would soon become my secret *white rabbit* that appeared whenever I stumbled upon any nontrivial mathematical riddle. It would start often like that: a simple formulation, an equality sign, a question mark; and it would soon become the entrance to an intriguing maze of implications and deductions. As I took wrong turns and stumbled upon obstacles, the desire for an elegant solution would drive my hand until the final epiphany. Each discovery and every solution would renovate the urge to communicate, or rather to teach.

That is why, as I was standing in front of my very first students, I suddenly felt the pleasure that I was about to disclose years of unraveled labyrinths and untied knots. Unsurprisingly I found myself asking the following question: “How can I teach the feeling of joy behind a mathematical concept?” or in other words: “How can I be a good teacher?” Almost six years have passed since that unforgettable day. Although I now have at least some hints to my pristine question, every lecture I find myself asking: “How can I be a *better* teacher?”

I soon realized that the first obstacle against an effective student-teacher communication is the baggage of irrational fear and prejudice that students, especially first-timers, have for mathematics. In fact, common misconceptions relegate mathematics as a cold, distant collection of formulas that only exist as black ink over a sheet of paper. I had the chance to realize that providing the right motivation to students represents an effective way to help them overcome the aforementioned fear.

A one-of-a-kind peculiarity in math classes is that typically students have different backgrounds and majors. This heavily influences their motivation and expectations about the class. For this reason, at the beginning of each semester, I arrange short meetings with my students in order to learn about their backgrounds, needs and expectations from the course. Once I establish a sufficient knowledge about my students, I tune and adjust in-class discussions as well as course material (quizzes and worksheets) accordingly. For example, I assign extra reading and exercises that require an in-depth understanding of technical concepts and proofs to students majoring in math. Similarly, I provide extra pointers to engineering students about how to apply a considered mathematical tool to approach real-world problems. Furthermore, I create additional material regarding economy-related applications for business and finance students, and so on.

I generally introduce a new topic by exposing the students to a class of problems that they cannot solve using what they have learned so far. I achieve this by posing a question and encouraging a discussion about possible approaches for a solution. Only when I believe that I have provided enough time for the students to think through the questions, I begin entering the new topic, combining technical details and examples.

E. M. Forster once said: “*Spoon feeding, in the long run teaches us nothing but the shape of the spoon*”¹. I believe that this quote embeds a fundamental guideline for effective teaching: long-term learning for a student cannot be achieved through passive listening, but only through active participation. This is because there is usually no way to convey an abstract idea unaltered from the teacher’s mind to the student. Instead, the teacher should provide the basic knowledge/material, allow students to reason about it thoroughly and develop their own way of thinking. The main advantage of this approach is that students are encouraged to be creative. Moreover, it generates a sense of self-accomplishment that will be a push for further learning.

Since my teaching methodology revolves around active learning, I adopt two main strategies. First, in discussion sections I put students into groups of 3 or 4 people, so that they have the opportunity to discuss problems and course material with their peers. At the same time, they develop collaboration and teamwork skills. In fact, when students are given the opportunity to interact with each other, they are more likely to feel like part of a community and become engaged with the course. Second, I believe that thinking is not driven by answers but by questions and that only students who have questions are really thinking and learning. For this reason, I try to create an environment where each student feels comfortable about asking questions.

Once the semester is over, I never feel that the communication with my students terminates. Conversely, I encourage them to get in touch with me for course-related questions. Ultimately, my highest reward is to know that I will always have a role in the successful career of many beautiful minds.

Some comments from my students’ evaluations (Instructor - Math 220)

- What are the major strengths and weaknesses of the instructor?

“Exceptionally good at explaining any math concept we encountered. She was always very patient and accommodating to myself + other students when we did not understand a topic/concept or needed help. There were times that she extended office hours to help us, despite being very busy with research and such. She always was good at keeping us interested in class and coming to class. I actually wanted to go to a math class”.

- What aspects of this course were mostly beneficial to you?

“Applications of concepts/problems in biological science terms/examples. It is one thing to solve a math problem like a puzzle, it’s another to see where that “puzzle” exists in reality”.

- What do you suggest to improve this course?

“Have her teach each and every Calculus course at the University. She is fantastic”.

“[...] Have her always teach this course. [...] She is the best math instructor I have ever had”.

¹ E. M. Forster, in “The Observer”, October 7, 1951